

Notes on Breeding the Grayling
(*Hipparchia semele* L.) ab. *holonops* Brouwer

By RICHARD REVELS*

While on a few days collecting holiday in Dorset during late July 1975, I found a colony of the Grayling (*H. semele* L.), in which occasionally specimens were without the normal spot markings on the forewings; a rather rare form known as ab. *holonops* Brouwer (figs. 1 and 2). Some were only "blind" on one surface, having a trace of the top spot still remaining on the other surface. Specimens with the spotting reduced to just the top one on the forewings, but being present on the top and under surfaces, ab. *monocillata* Lempke (figs. 3 and 4), were more frequently found, with perhaps one in every 50 examined being of this form. Both these aberrations were more frequent in the males.

When I caught a female ab. *holonops*, I decided the opportunity must not be missed to breed this interesting form. So she was kept in a cool atmosphere until I returned home the next day, when I put her into one of my breeding cages containing cut flowers in jam jars of water for her to feed on. During the following week about 70 ova were laid, mostly on the netting which covered the top of the cage. I cut up the netting, and the small pieces of net with the eggs on were placed in a plastic container until they began to hatch. The small larvae and the remaining ova were then put on grass growing in a tub, and netted over. This tub stood in a bowl of water which acted as a moat to keep out predators such as earwigs and beetles, as well as, of course, to provide sustenance for the grass.

In early October I decided to split the larvae into two groups. Accordingly, about half were put into a wooden cage which had a mixture of small creeping grasses growing in it, and the rest were left in their tub. An inspection of the larvae during a mild spell of weather at the end of December 1975, revealed that both lots were active and had been feeding recently. In the tub I found two black beetles which I think had made a meal of some of the larvae, as I could only find about half the number I had put in there two months earlier. All seemed well in the cage, and just after dark on 1st January, 1976, I made an inspection by torch light and saw several larvae feeding on the grass: they were about 7 mm. long.

During the spring, the larvae were mostly fed on *Poa annua*, and in mid-June they went underground to pupate. The F₁ generation hatched during July and produced eight males and 11 females; all typical and mostly larger than the wild specimens I have in my collection. The males were about 30 mm. from the centre of the thorax of the wing tip (fig. 8), and the females about 33 mm.

I managed to get several pairings which produced altogether about 300 ova, and, as before, most were laid on

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the netting which covered the laying cage. I sent about 100 of these ova to a friend, Mr. R. Tubbs; the remainder I split into three groups of about 70, each lot being placed on grass growing in tubs as before. An inspection a month later revealed that all was well in two of the tubs, but the other one contained three earwigs and only one larva, so presumably these earwigs had eaten the ova or small larvae. I think these predators must have got in by entering the holes in the bottom of the tub, and climbed up the inside when the "moat" dried up, which happened several times during the very hot 1976 summer. This mishap illustrates the importance of splitting up stock, so that all is not lost in such a disaster.

I do not now over-winter my larvae on annual meadow grass (*Poa annua*), as this suffers badly from mildew and often dies off completely. I have found that Yorkshire Fog (*Holcus lanatus*) and Creeping Bent (*Agrostis stolonifera*) over-winter much better, and the larvae of most Satyridae seem to thrive on these grasses. Two tubs and a wooden cage were set with a mixture of these two grasses, and about 70 larvae were transferred to this new crop. Twenty-four were put in the cage, and thus received some protection from the worst of the weather; the remainder were divided between two tubs and netted over. Both the tubs and the cage were left outdoors all through the winter, which was rather colder than for several years.

In early February 1977, shortly after a cold spell had given way to rather milder conditions, I made an inspection by torch light just after dark, and saw a good number of larvae feeding on the grass, so it seems that even in winters which have frequent frosts, *H. semele* larvae do not hibernate properly, but just go dormant when the weather is cold and become active again when the temperature rises.

In early April 1977, I found 70 healthy looking larvae which I moved on to fresh grass; so it seems they had all come through the winter successfully. However, in early June I found several diseased larvae in the cage, and also two in one of the tubs. I moved the healthy looking ones to new tubs with fresh grass, but despite this I continued to have fatalities. Finally, only about 30 larvae went down to pupate, from which 21 produced butterflies, giving me a total of nine males and 12 females in this F_2 generation. Two of the females were ab. *holonops* (figs. 5 and 6), but only one of the males was aberrant, this having the top spot missing on the upper surface of the forewings (fig. 7), and a form that I have not seen or heard of before, as this is usually the last spot to vanish. Most of this brood were below average size, and looked quite small when compared with the large F_1 generation (fig. 8) specimens.

Ralph Tubbs had no disease in his brood of this stock, but nonetheless had a disappointing hatch, and again they were rather small sized insects. His hatch consisted of 12 typical and one female ab. *holonops*. Together this gave us a total of 31 type, three ab. *holonops* and the male ab. (which we do not think is connected with the *holonops* gene, but which

just turned up as a bonus). As *holonops* does not occur in the F₁ generation, it seems probable that it is a "simple recessive", but the numbers were below the 25% that would be expected in the F₂ hatch; however, the ab. gene may well be responsible for weakening the stock. It is strange that in the wild, this ab. is more frequently found in the males, while we only bred it in the females.

I sent several of the diseased larvae to Claude Rivers, whose department is the Unit of Invertebrate Virology, at Oxford University. The department found that they had died from Cricket paralysis virus, or a closely related virus, which reacted against cricket paralysis antiserum. I was told to keep a close watch on my other stocks as this virus seems to be able to infect a wide range of species of lepidoptera. Mr. Rivers gave me advice on ways to deal with this outbreak, and I accordingly purchased a large plastic dustbin, which I partly filled with a mixture of 10% solution of sodium hypochlorite, to 90% water. My cages, tubs and netting were all immersed in it for about an hour, and then thoroughly washed in clean water. Hopefully I have got rid of this virus, as none of my other stocks seem to have been infected up to the time of writing; however, I shall be making regular checks during the 1978 spring.

ABNORMAL ABUNDANCE OF MOTHS IN AN M.V. LIGHT TRAP IN JULY 1977. — While on holiday at Pont-ar-dulas, Llanafan Fawr, Builth Wells, Breconshire, from 9th-24th July, there were fantastic numbers of moths. So many gathered in the trap that we had to stop using it and rely on collecting from a sheet.

Having had to stop using the trap for several nights because of the vast numbers collected, the night of 12th July, 1977 was cooler and it was decided to use the trap again. In the morning there appeared to be a marked increase in the weight of the trap. It was therefore weighed on a spring balance and was found to be 18½ lbs. The trap contained 14 half egg trays, one of which was carefully removed with its complement of moths and placed in a polythene bag with a small quantity of killing agent. The moths were then counted. There were 611, nearly all noctuids. It would appear that, as the trays were equally loaded and in addition there was a thick layer in the bottom, the total number of moths present was about 10,000. All the moths were removed, the egg trays returned to the trap which was weighed. To our surprise it weighed 14 lbs. This suggests that there were 4½-5 lbs. of moths in the trap. Of the 10,000 moths, at least 7,000-8,000 were *Agrotis exclamationis* L. — Dr. H. G. PARKER, 2 Oaks Road, Kenilworth, Warwickshire, CV8 1GE.

CORRECTION

Reference "October in Scilly" by G. Summers (*antea* 90: 66), in line four down insert between "following species: " and "*Vanessa atalanta*": *Pararge aegeria* L.